employ and their output is enormous. Some have been strongly influenced by scientific management, some moderately and some very little. There is a very considerable proportion of medium sized plants some of which may have continuous processing in one or more departments, although they would not be classified as mass production establishments. These also have been influenced more or less by scientific management. The dominant proportion of establishments—chiefly, although not altogether, of small size—have managements representing inherited patterns modified by casual imitation. Among all of these classes can be found only a small handful of well-rounded developments of scientific management.

The large class of plants dominated by tradition and imitation has naturally appropriated some of the mechanisms of scientific management, and although the net result has been a gradual raising of the level of management in such plants, this result has not been achieved in all cases. Very serious damage in individual instances to managerial efficiency and harmonious relations with workers, and to the good repute of scientific management, has resulted from failure to adopt ideals and spirit along with mechanisms. It is in this class of plants that the superficial "efficiency engineer" has found his clientele, and as he has not hesitated to seek the advantage of proclaiming himself a representative of scientific management, the harm he has been able to bring temporarily to scientific management has been considerable. But American managements are becoming more discerning, discriminating and cautious, and the baneful influence of the "efficiency engineer" appears to be declining.

The concern of scientific management for harmonious industrial relations, and workers' prosperity and goodwill, has always been deep, for one of the first discoveries of research in management is that goodwill is a productive power independent of the efficiency of equipment and method, a power which adds to that efficiency. But scientific management considers workers' welfare and goodwill, not as something which can be generated effectively as a thing apart from the spirit and methods of management, but as something which is dependent on and a consequence of these. Good management and workers' welfare are the two terms of an equation; it matters little which term is put first.

The lines are many along which scientific management contributes to workers' welfare and goodwill, and to harmonious industrial relations. The entire list enumerated below can be achieved only by a management of superlative vision, understanding and leadership ability, yet the total group of items in the list is true of a particular enterprise which the author has in mind, and other enterprises have achieved a greater or less proportion of these items, according to the capacity for leadership and co-operation present in both the management and the workers in particular instances. Scientific management aims:

1. To gauge industrial tendencies and the market,[11] in order thereby to regularize operations in a manner which will conserve the investment, sustain the enterprise as an employing agency and assure continuous operation and employment.

2. To assure the employe not only continuous operation and employment by a correct gauging of the market, but also to assure by planned and balanced operations a continuous earning opportunity while on the payroll.

3. To earn, through a waste saving management and processing technique, a larger income from a given expenditure of human and material energies, which shall be shared by workers and management. Scientific management plants generally pay wages above the market.

4. To make possible a higher standard of living as a result of increased income to workers.

5. To assure a happier home and social life to workers through removal by increase of income of many of the disagreeable and worrying factors in the total situation.[12]

6. To assure healthful as well as individually and socially agreeable conditions of work.

7. To assure the highest opportunity for individual capacity through scientific methods of work analysis and of selection, training, assignment, transfer and promotion of workers.

8. To assure by training and instructional foremanship the opportunity for workers to develop new and higher capacities, and eligibility for promotion to higher positions.

9. To develop self-confidence and self-respect among workers through the opportunity afforded for the understanding of one's own work specifically, and of plans and methods of work generally.

10. To develop self-expression and self-realization among workers through the stimulative influence of an atmosphere of research and valuation, through understanding of plans and methods, and through the freedom of horizontal as well as vertical contacts afforded by functional organization.

11. To eliminate factors of the environment which are irritating and the causes of frictions, and to promote common understandings, tolerances, and the spirit of team work.

These aims—some of them results of early experience with scientific management which have been adopted as the aims of subsequent activity—have not been achieved with equal success in all scientific management plants, and are not the exclusive possession of that small group of plants which may properly be classified as representatives of scientific management. But the literature of scientific management reveals that these have consistently been its aims; most of them from the beginning of the movement, and others as experience has disclosed their importance and practicability. Scientific management has always been characterized as progressive in its concepts of the solution of the problems of industrial relations. Investigation and comparison of plants reveal that generally the more complete the development of a technique of scientific management, the more completely are these aims represented in policy and procedures, and the more favorable the response of workers. The reason for this correlation is not difficult to understand. Scientific management seeks and, the more completely it is developed in a plant, realizes a stability of conditions and a sureness and economy of effort which are impossible without the goodwill and co-operation of the workers. The achievement of the goodwill and co-operation of the workers has consistently been an objective and has never been a problem for scientific management plants.

Entirely distinct from the reactions of workers employed in scientific management plants, and chiefly representing the reactions to scientific management as a theory on the part of organizations of labor not strongly represented in such plants, was the opposition of nationally organized labor for a period of about six or seven years prior to the war. The opposition fortunately has practically disappeared and can be analyzed as are other historic events.

Scientific management came to public attention in the United States through certain hearings before the Interstate Commerce Commission in the winter of 1910-1911. Newspapers and magazines discovered its news value and deluged the public with articles concerning it. And although organized labor had given it no attention during the first thirty years of its slow development, now that the public was becoming interested, labor also became interested. It analyzed scientific management as a doctrine and found grounds for opposition. These grounds were not unreasonable inferences from the inadequate early expositions of scientific management. The reasons for opposition, some declared and some not declared, may be reduced to four:

1. Organized labor had had a long and hard struggle to achieve status in the face of industry's strong opposition, and its natural and not unreasonable assumption was that anything new originating in management and by management was for ownership's advantage and presumably to labor's disadvantage.

2. Assertions concerning the developments of a "science for each operation" and the reduction of operating methods to easily understood instructions, caused a fear of the loss to labor of craft distinctions and of the power of labor in the possession of craft knowledge and skill.

3. Numerous statements concerning economies which had been effected by scientific management, especially in the nature of labor saving, called up at once the instinctive fear that a general adoption of scientific management would cause widespread discharges and unemployment.

4. Inadequate explanations of the use and limitations of time study and of reasons for increase of productivity, led to an assumption that scientific management means a speeding up, wearing out and eventual casting aside of the individual worker.

In view of the atmosphere of distrust between industry and organized labor at that time, these arguments of opposition were not unnatural. They were assumptions and were wrong. The replies

[11] Where there are huge investments of capital in fixed and specialized form this may mean a consideration of social desirability, or long run fundamental usefulness, as bearing on long run demand.

[12] Says one exponent of scientific management concerning his group of seven mills: "While not unmindful of the importance of stability that is coupled with material success, their interest is quite as much in producing better citizens as in securing profits." *Bulletin of the Taylor Society*, Vol. XII, No. 6, December, 1927, p. 525.